Long-term survival of dialysis patients in the U.S. with implantable cardioverter defibrillators (ICDs) or cardiac resynchronization therapy-defibrillator (CRT-D) devices

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Introduction

- Dialysis patients are at high risk for sudden cardiac death, which accounts for 27% of all-cause mortality.
- The rate of sudden cardiac death among all US dialysis patients is 7% per year (USRDS ADR 2006).
- We have previously shown that the use of implantable cardioverter-defibrillators (ICDs) for secondary prevention of death in cardiac arrest survivors on dialysis is associated with a 42% reduction in mortality (Herzog et al, IJ, 2005).
- Few data exist on the comparative long-term survival of dialysis patients following implantation of ICD or cardiac resynchronization therapy plus defibrillator (CRT-D) devices.

Study design

- Retrospective cohort study
- Data sources
  - USRDS database (n=1,801,298)
- Study population
  - ESRD patients with a first implantation of ICD or CRT-D during 1996-2005 and with Medicare as their primary payor
  - Initiated ESRD therapy at least 90 days before implantation and on dialysis on the date of Implantation
  - Age 20 and older on the date of implantation
  - Resided in the 50 states, the District of Columbia, Puerto Rico, or the Territories
  - Exposure
    - Device type: identified through ICD-9-CM procedure codes in Medicare Part A inpatient and outpatient claims
    - ICD: 37.94
    - CRT-D: 00.51
    - Implant indication: defined based on ICD-9-CM diagnosis codes in the claims during the hospitalization for implant
    - Secondary prevention: 427.1 (paroxysmal ventricular tachycardia), 427.4 (ventricular fibrillation and flutter), or 427.5 (cardiac arrest)
    - Primary prevention - diagnosis codes other than 427.1, 427.4, or 427.5
- Outcome: all-cause mortality
- Sample size: n=5,612

Methods

- Four patient subgroups were constructed based on device type and implantation indication.
- Major comorbid conditions are defined from the Medicare claims during the one year prior to device implantation and from the Medical Evidence Form submitted at the initiation of ESRD treatment.
- Patients are followed from the date of the first implantation to the earliest of death, the date of the second device implantation, three years after the first implantation, or June 30, 2006.
- Long-term survival is estimated by life-table method.
- The Cox proportional hazards model, with adjustment for patient characteristics at baseline, is used to estimate the effect on all-cause mortality for
- CRT-D compared with secondary prevention by device type

Conclusions

- Dialysis patients receiving ICD or CRT-D devices are at high risk for mortality.
- The survival of dialysis patients receiving device therapy is not related to either device type (ICD vs CRT-D) or implant indication (primary vs secondary prevention of sudden death).
- Limitations:
  - Observational study
  - Potential for selection bias
  - Administrative data